

What is Claimed is:

- 5 1. A method of magnetic resonance imaging of regional blood oxygenation which comprises administering into the vasculature of a vascularised human or non-human animal subject a  $T_2$  blood pool contrast agent, detecting a magnetic resonance signal from at least part of the vasculature of  
10 said subject into which said contrast agent distributes, and manipulating said signal to generate an indication of the partial pressure of oxygen ( $pO_2$ ) in at least part of said vasculature.
- 15 2. The method of Claim 1 wherein  $R_1$  of blood in an artery is determined and hematocrit is determined therefrom.
3. The method as claimed in Claim 1 wherein hematocrit and  $R2^*$  of blood in a vein are determined and  $pO_2$  in said vein  
20 is determined therefrom.
4. The method of Claim 1 wherein said indication is an image indicative of  $pO_2$ .
- 25 5. The method of Claim 1 wherein said contrast agent is administered in an effective amount such that  $R2^*$  of venous blood is less than  $R2^*$  of arterial blood.
6. The method of Claim 4 wherein said contrast agent is  
30 administered in an effective amount such that  $R2$  of venous blood is greater than  $R2$  of arterial blood.
7. The method of Claim 6 wherein a non-spoiled gradient echo sequence is used to generate a magnetic resonance

image.

8. The method of Claim 7 wherein a spoiled gradient echo  
sequence is used to generate a further magnetic resonance  
5 image and the images from the spoiled and non-spoiled  
gradient echo sequences are subtracted to produce an image  
in which the signal difference between arteries and veins is  
enhanced.

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